

CONSTRUCTION PERMIT - PSD APPROVAL - NSPS SOURCE

PERMITTEE

Elwood Energy III, LLC
Attn.: Ronald D. Usher
P.O. Box 26532
Richmond, Virginia 23261

Application No: 00100077

I.D. No.: 197035AAH

Applicants Designation: 2 SCCT III

Date Received: January 27, 2000

Subject: Electric Generation Facility

Date Issued:

Location: Elwood Energy Center, 20900 West Noel Road, Elwood, Will County

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of three natural gas fired combustion turbines and associated fuel gas heaters, as described in the above referenced application and summarized in Attachment A. This Permit is granted based upon and subject to the findings and conditions that follow:

In conjunction with this permit, approval is given pursuant to the federal rules for Prevention of Significant Deterioration of Air Quality (PSD) to construct the above referenced project, in that the Illinois Environmental Protection Agency (Illinois EPA) finds that the application fulfills all applicable requirements of 40 CFR 52.21. This approval is issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 et. seq., the federal rules promulgated thereunder at 40 CFR 52.21 for Prevention of Significant Deterioration(PSD), and a Delegation of Authority agreement between the United States Environmental Protection Agency and the Illinois EPA for the administration of the PSD Program. This approval becomes effective in accordance with the provisions of 40 CFR 124.15 and may be appealed in accordance with the provisions of 40 CFR 124.19. This approval is also based upon and subject to the following findings and conditions which follow:

Findings

- 1a. Elwood Energy III, LLC (Elwood III) has requested a permit for an electric generation facility that would include three "simple cycle" combustion turbines (CT). The facility would have the ability to generate up to about 516 MW (nominal) of electrical energy. The facility would be fired on natural gas.
- b. Elwood III is a separate corporate entity from the existing Elwood Energy Center electric power plant and the proposed Elwood Energy II, LLC facility. However, the three facilities are considered a single source for purposes of the federal PSD rules.
2. The Elwood Energy Center is located in Jackson Township, Will County. The area is currently designated nonattainment for ozone and attainment for all other criteria pollutants.

- 3a. The proposed project has the potential to emit significant amounts of nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM/PM₁₀) as defined by the PSD rules. The project is therefore subject to PSD review for NO_x, CO and PM/PM₁₀. Potential emissions of these pollutants from the project are shown in Attachment B.
- b. The potential emissions of sulfur dioxide (SO₂) are below the PSD significant emission rate.
- c. The potential volatile organic material (VOM) emissions from the project (11.35 ton/yr) and the aggregate net increases over the last five years are both less than 25 tons per year. Therefore, the project is not subject to the state rules for Major Stationary Source Construction and Modification (MSSCAM), 35 IAC, Part 203.
- d. The proposed project would have annual emissions of hazardous air pollutants that are be less than 10 tons of any hazardous pollutant and less than 25 tons in aggregate for any combination of hazardous air pollutants, as indirectly addressed by limits on emissions of criteria pollutants. Therefore, the project is not subject to review under Section 112(g) of the Clean Air Act.
4. After reviewing the materials submitted by Elwood III, the Illinois EPA has determined that the project will (i) comply with applicable Board emission standards (ii) comply with applicable federal emission standards and (iii) utilize Best Available Control Technology (BACT) on emissions of NO_x, CO and PM/PM₁₀.
- 5a. The combustion turbines are affected units under the Acid Rain Deposition Control Program pursuant to Title IV of the Clean Air Act and are subject to certain control requirements and emissions monitoring requirements pursuant to 40 CFR Parts 72, 73 and 75. As affected units under the Acid Rain Program, Elwood Energy III must also obtain an Acid Rain Permit before commencing operation.
- b. This source is considered a "participating source" for purposes of the Emissions Reduction Market System (ERMS), 35 IAC Part 205. Pursuant to 35 IAC 205.150(c)(1) and 35 IAC 205.720, as of December 31 of each year, this source shall hold Allotment Trading Units (ATUs) in its account in an amount not less than the ATU equivalent of its VOM emissions during the preceding seasonal allotment period (May 1 - September 30), not including VOM emissions from insignificant emission units and activities, in accordance with 35 IAC 205.220, or the source shall be subject to "emissions excursion compensation."
6. The air quality analysis submitted by Elwood III and reviewed by the Illinois EPA shows that the proposed project will not cause violations of the ambient air quality standard for NO_x, CO and PM/PM₁₀. The analysis shows that project will have insignificant impacts on ambient air quality.

7. The Illinois EPA has determined that the proposed project complies with all applicable Illinois Air Pollution Board Regulations and the federal rules for Prevention of Significant Deterioration.
8. A copy of the application, the project summary and a draft of this permit were placed in a location in the vicinity of the project, and the public was given notice and an opportunity to examine this material and to submit comments and to participate in a public hearing on this matter.

The Illinois EPA is issuing approval to construct the proposed project subject to the following conditions and consistent with the specifications and data included in the application. Any departure from the conditions of this approval or terms expressed in the application would need to receive prior written authorization by Illinois EPA.

Conditions

1. Standard conditions for issuance of construction permits, attached hereto and incorporated herein by reference, shall apply to this project, unless superseded by the following special conditions.
- 2a. Each CT shall not be operated for more than 3,200 hours per calendar year.
 - b.
 - i. The Permittee shall equip each CT with dry low NO_x burners, which burners shall be maintained and operated in accordance with good air pollution control practice.
 - ii. The Permitted shall use good combustion practices to minimize emissions of CO and PM from each CT. These practices shall include routine operating practices, maintenance and repair practices, and other periodic assessments of the combustion performance of each CT to reasonably minimize emissions of CO and PM.
 - c.
 - i. The emissions of NO_x from each CT shall not exceed 9 ppmvd @ 15% O₂ (which corresponds to 0.037 lb/mmBtu) on an hourly average.
 - ii. The emissions of CO from each CT shall not exceed 3.5 ppmvd @ 15% O₂ on an hourly average.
 - iii. These emission limits do not apply during periods of startup and shutdown as addressed by Condition 3 and only become effective after the initial shakedown period provided for by Condition 9(a).
3. Each CT shall be operated in a manner consistent with good air pollution control practices to minimize emissions during startup and shutdown, including the following. These practices shall be reviewed at least annually and revised as necessary based on actual operating experience and performance of the CT.
 - a. The Permittee shall manage the operation of the CTs to provide adequate time for normal startup of the CTs, except for

emergencies, and to minimize multiple startups of a CT in a single day, unless startup or operation is tripped off.

- b. Operation in accordance with the manufacturer's written instructions or other written instructions developed and maintained by the Permittee, which shall include at a minimum the following measures:
 - i. Review of operating parameters of the CT during startup, or shutdown as necessary to make adjustments to reduce or eliminate excess emissions.
 - ii. Implementation of inspection and repair procedures for a CT prior to attempting startup following repeated trips.
- c. Maintenance of the CT in accordance with written procedures developed and maintained by the Permittee.

Condition 2 and 3 represents the application of the Best Available Control Technology as required by Section 165 of the Clean Air Act.

- 4a. The combustion turbines are subject to the New Source Performance Standard (NSPS) for Stationary Gas Turbines, 40 CFR 60, Subpart A and GG. The Illinois EPA is administrating NSPS in Illinois on behalf of the United States EPA under a delegation agreement.
 - i. The NO_x emissions from each CT shall not exceed the limit established by the NSPS, pursuant to 40 CFR 60.332 (a)(1).
 - ii. The emission from each CT shall not contain SO₂ in excess of 0.015 percent by volume at 15 % O₂ and on a dry basis or the CT shall not burn any fuel which contains sulfur in excess of 0.8 percent by weight, pursuant to 40 CFR 60.333 (a) and (b).
- b. At all times, the Permittee shall maintain and operate the CT in a manner consistent with good air pollution control practice for minimizing emissions, pursuant to the NSPS, 40 CFR 60.11(d).
- 5. The emission of smoke or other particulate matter from a CT or fuel heater shall not have an opacity greater than 30 percent, pursuant to 35 IAC 212.123(a), except as allowed by 35 IAC 201.149, 212.123(b) or 212.124.
- 6a. Hourly emissions from the CTs shall not exceed the emission limits in Table 1A.
- b. Annual emissions from the CTs shall not exceed the emission limits in Table 1B. Compliance with these annual limitations shall be determined from a running total of 12 months of emission data as further provided below:
 - i. Emissions of NO_x shall be determined by the Continuous Emissions Monitoring System (CEMS) addressed by Condition 11, which shall be operated during startup and shutdown of the CTs;

- ii. Unless emission monitoring is performed for the pollutant, emissions of other pollutants during periods other than startup and shutdown shall be determined from emission factors developed from testing in accordance with Condition 10 (CO, VOM and PM/PM₁₀) or standard factors (SO₂).
 - iii. Unless an alternative factor is established for the pollutant or emission monitoring is performed for the pollutant, emissions of NO_x, CO and VOM during an hour that includes a startup shall be assumed to be at the limits in Condition 6(a) multiplied by a startup factor (S): S_{CO} = 10 and S_{VOM} = 20. For example, the CO emissions during an hour that includes a startup shall be assumed to be 156.5 pound per hour (10 x 15.65 = 156.5). These assumptions are based on data in the application describing emissions during startup of a CT. Any alternative factor for emissions during startup of a CT shall be based on representative emission testing conducted with USEPA Reference Test Methods (Refer to Condition 10(b)(i)).
- 7a. The only fuel fired in the CT shall be natural gas, as defined in 40 CFR 60.41c.
- 8a. After initial startup, commissioning and shakedown are completed, the CTs shall only be used for peaking operation or for the purpose of evaluating or verifying operation, or emissions testing.
- b. For the purposes of this permit, peaking operation means operation when base load generation capacity is insufficient to meet electrical demand and operating reserve requirements, due to high demand, outage of base load generating units, restrictions or interruptions in the power grid, etc. Peaking operation may include operation of a CT to meet electrical demand from utilities other than the local utility. A CT shall be presumed to be being used for peaking operation if it complies with the limitations on operation set elsewhere in this permit.
- 9a. Under this permit, each CT may be operated for a period of up to 180 days from initial startup to allow for equipment shakedown and emissions testing as required. This period may be extended by the Illinois EPA upon request of the Permittee if additional time is needed to complete shakedown or perform emission testing, provided however that an hourly NO_x emission limit representing 15 ppmvd NO_x @ 15% O₂ (equivalent to 0.062 lb/mmBtu) shall apply during such extended shakedown.
- b. Upon successful completion of emission testing demonstrating compliance with applicable limitations, the Permittee may continue to operate a CT as allowed by Section 39.5 (5) of the Environmental Protection Act.
 - c. This condition supersedes Standard Condition 6.
- 10a. Within 60 days after operating a CT at the greatest load at which it will normally be operated but not later than 180 days after its initial startup, the nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic material (VOM), particulate matter (PM), and oxygen (O₂)

concentrations in the exhaust of the CT and the opacity of exhaust shall be measured by an approved independent testing service as follows to determine compliance with the emissions limits in Condition 2, 4, 5 and 6:

b. The following methods and procedures shall be used for testing of emissions:

i. The following USEPA test methods shall be used:

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3 or 3A
Moisture	USEPA Method 4
Opacity	USEPA Method 9
Carbon Monoxide	USEPA Method 10
Volatile Organic Material	USEPA Method 18, 25 or 25A
Nitrogen Oxides	USEPA Method 20
Particulate Matter	USEPA Method 5
Particulate Matter ₁₀	USEPA Method 201 or 201A (40 CFR 51, Appendix M)

ii. Measurements for NO_x shall be conducted in accordance with 40 CFR 60.335, as specified below:

- A. The NO_x emissions shall be computed for each run using the equation in 40 CFR 60.335(c)(1).
- B. The span values for Method 20 shall be 300 ppm of NO_x and 21 percent O₂, pursuant to 40 CFR 60.335(c)(3).
- C. The NO_x emissions shall be determined at four points in the normal operating range of the CTs, including the minimum point in the range and peak load, pursuant to 40 CFR 60.335(c)(2).
- D. All loads shall be corrected to ISO conditions using the appropriate equations supplied by the manufacturer, pursuant to 40 CFR 60.335(c)(2).

iii. Measurements for other pollutants shall be conducted as follows:

- A. CO, PM and VOM concentrations shall be measured at peak and minimum CT load.
- B. PM emissions measured by USEPA Method 5, including back half condensable particulate, may be provided as an alternative to measurement of PM₁₀ emissions using USEPA Method 201 or 201A.
- C. Measurements for organic hazardous air pollutants in the VOM (e.g., formaldehyde, toluene, acetaldehyde, and acrolein) shall be provided if VOM emissions are measured by Method 18. (See also Condition 8(c)(iii).)

- c. At least 60 days prior to the actual date of testing, a written test plan shall be submitted to the Illinois EPA for review. This plan shall describe the specific procedures for testing and shall include as a minimum:
 - i. The person(s) who will be performing sampling and analysis and their experience with similar tests.
 - ii. The specific conditions under which testing shall be performed including a discussion of why these conditions will be representative of maximum emissions and the means by which the operating parameters for the CT will be tracked and recorded.
 - iii. The specific determinations of emissions that are intended to be made, including sampling and monitoring locations and identification of organic hazardous air pollutants that will be measured. As part of this plan, the Permittee may set forth a strategy for performing emission testing of selected CTs provided that all CTs are fitted for testing; the identity of the CTs to be tested is determined immediately before testing, by the Illinois EPA or otherwise randomly; and continuous emission monitoring of NO_x is present on all CTs. The Permittee may also propose a plan for testing across the normal operating range of the CTs.
 - iv. The test method(s) that will be used, with the specific analysis method, if the method can be used with different analysis methods.
- d. The Illinois EPA shall be notified prior to these tests to enable the Illinois EPA to observe these tests. Notification of the expected date of testing shall be submitted a minimum of 30 days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of 5 working days prior to the actual date of the test. The Illinois EPA may at its discretion accept notifications with shorter advance notice provided that the Illinois EPA will not accept such notifications if it interferes with the Illinois EPA's ability to observe testing.
- e. Three copies of the Final Reports for these tests shall be forwarded to the Illinois EPA within 30 days after the test results are compiled and finalized. The Final Report from testing shall contain a minimum:
 - i. General information, i.e., test date, personnel, etc.;
 - ii. A summary of results;
 - iii. Description of test method(s), including a description of sampling points, sampling train, analysis equipment, and test schedule;
 - iv. Detailed description of test conditions, including:
 - A. Fuel consumption (standard ft³);
 - B. Firing rate (million Btu/hr); and

- C. Combustion turbine/generator output rate (MW).
 - v. Data and calculations, including copies of all raw data sheets and records of laboratory analysis, sample calculations, and data on equipment calibration.
- 11a. The Permittee shall install, operate, and maintain a Continuous Emissions Monitoring (CEM) system to measure emissions of NO_x from each CT in accordance with the federal Acid Rain Program, which CEMS shall also be used to demonstrate compliance with the limitations of this permit.
- b. i. The procedures under 40 CFR 60.13 and 75.12 and 40 CFR 75, Appendix F shall be followed for the installation, evaluation, and operation these CEM systems.
 - ii. At least 30 days prior to initial startup of a CT, the Permittee shall submit to the Illinois EPA for review and comments a detailed plan describing the configuration and operation of the NO_x CEM system(s). The plan shall also state whether the Permittee is installing a SO₂ CEM system (40 CFR 75.11) rather than sulfur analysis and flow monitoring equipment in accordance with 40 CFR 75.11(e).
 - c. These CEMs shall be operational and collecting data in accordance with the provisions of the Acid Rain Program.
12. The Permittee shall sample and analyze for sulfur and nitrogen content of the fuels being fired in each CT in accordance with 40 CFR 60.334(b) unless the Permittee has a custom schedule approved by the USEPA, for the determination of these values based on the design and operation of the source and the characteristics of the fuel supply.
13. The Permittee shall install, operate, and maintain monitors on each CT to measure and record fuel consumption.
- 14a. The Permittee shall maintain a file of the following items:
- i. The heat content of the fuel fired in the CTs (Btu/standard ft³);
 - ii. The sulfur content of the fuel fired in the CT in accordance with Condition 12.
- b. The Permittee shall maintain records of the fuel consumed for each CT (standard ft³), as measured in accordance with Condition 13.
 - ii. Operating hours for each CT.
 - c. The Permittee shall maintain operating logs for each CT, which at a minimum shall include daily information for operating hours and fuel consumption and periods of time when inlet air cooling is used.

- c. The Permittee shall maintain the following records related to startup and shutdown of each CT:
 - i. The following information for each startup of the CT:
 - A. Date and time of startup;
 - B. A description of the startup, if written operating procedures are not followed during the startup or operating problems occur during the startup, including detailed explanation.
 - ii. The following information for each shutdown of the CTs:
 - A. Date and time of shutdown;
 - B. A description of the shutdown, if written operating procedures are not followed during the shutdown or operating problems occur during the shutdown, including detailed explanation.
 - iii. The following information for a CT when opacity is observed that is above normal startup or routine operation opacity:
 - A. Date, time and duration of observed above normal opacity.
 - B. A description of the observed opacity, the operating conditions of the CT, and possible causes for above normal opacity, e.g., excess natural gas pressure or low natural gas temperature.
 - C. A description of any corrective actions taken to reduce opacity.
 - D. Whether exceedance of Condition 5 [30 percent opacity] may have occurred, including any Method 9 readings taken by a qualified observer.
- e. The Permittee shall keep inspection, maintenance, and repair logs with dates and nature of activities for each CT.
- f. The Permittee shall keep the following records with regards to emissions:
 - i. NO_x emissions from each CT recorded hourly (in lb/mmBtu and lb or ton) by combining the NO_x concentration (in ppm) and diluent concentration (in percent O₂ or CO₂) measurements according to the procedures in 40 CFR 75 Appendix F;
 - ii. Monthly emissions of NO_x, VOM, CO, SO₂ and PM from the CTs (tons/month). NO_x emissions shall be based on data from the CEM. Emissions of SO₂ shall be determined in accordance with Condition 12. Emissions of CO, VOM and PM shall be calculated from fuel

consumption data and factors developed from emission testing or other methods approved by the Illinois EPA.

- iii. Total annual emissions of NO_x, VOM, CO, SO₂, and PM from the CTs based on monthly emission totals.
- g. The Permittee shall maintain copies of the following documents as its Compliance Master File for purposes of the ERMS [35 IAC 205.700(a)]:
 - i. Actual seasonal emissions of VOM from the source;
 - ii. A description of the methods and practices used to determine VOM emissions, as required by this permit, including any supporting documentation and calculations;
- h. The Permittee shall maintain records that identify:
 - i. Any periods during which a continuous monitoring system was not operational, with explanation.
 - ii. Any day in which emission exceeded an applicable standard or limit.
- 15. All records and logs required by this permit shall be retained at a readily accessible location at the source for at least three years from the date of entry and shall be available for inspection and copying by the Illinois EPA upon request. Any record retained in an electronic format (e.g., computer) shall be capable of being retrieved and printed on paper during normal source office hours so as to be able to respond to an Illinois EPA request for records during the course of a source inspection.
- 16a. For each CT, the Permittee shall fulfill applicable notification requirements of the NSPS, 40 CFR 60.7(a), including notifications for date of commencement of construction, and actual date of initial startup. With the notification for commencement of construction, the Permittee shall provide a copy of the manufacturer's guarantee for emissions.
 - b. The Permittee shall promptly notify the Illinois EPA if construction of a particular CT, once commenced, is discontinued or interrupted for a period of 18 months.
- 17a. If there is an exceedance of the requirements of Condition 2 through 6 of this permit, the Permittee shall submit a report to the Illinois EPA within 30 days after the exceedance. The report shall include a description of the exceedance, a copy of relevant records, and a description of the exceedance or violation and efforts to reduce emissions and future occurrences.
 - b. In conjunction with the Annual Emission Report required by 35 IAC Part 254, the Permittee shall provide:
 - i. For each CT the total operating hours;

- ii. A review of the use of each CT and the facility as a whole to confirm that they were used for peaking operation.
 - c. The Permittee shall comply with applicable reporting requirements under the Acid Rain Program, with a single copy of such report sent to Illinois EPA. This copy shall be sent to the Division of Air Pollution Control, Compliance Unit.
- 18a. Any required reports and notifications concerning equipment operation or a monitoring system shall be sent to the Illinois EPA at the following address unless otherwise indicated:
- Illinois Environmental Protection Agency (40-CASM)
Division of Air Pollution Control, Compliance Unit
P.O. Box 19276
Springfield, Illinois 62794-9276
Telephone: 217/782-5811 Fax: 217/524-4710
- b. A copy of all reports and notifications, as required above, except the Annual Emission Report required by 35 Ill. Adm. Code 254, shall also be sent to the Chicago Area Regional Office of the Illinois EPA.
- 19a. Pursuant to 40 CFR 52.21(r)(2), this permit shall become invalid if construction is not commenced within 18 months after this permit becomes effective, if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable period of time. The 18 month period may be extended by the Illinois EPA upon a satisfactory showing that an extension is justified. This condition supersedes Standard Condition 1.
- b. For purposes of the above provisions, the definitions of "construction" and "commence" at 40 CFR 52.21 (b)(8) and (9) shall apply, which require that a source must enter into a binding agreement for on-site construction or begin actual on-site construction. (Also see the definition of "begin actual construction," 40 CFR 52.21 (b)(11))
20. This Permit for the above referenced project does not relieve the Permittee of the responsibility to comply with all Local, State and Federal Regulations which are part of the applicable Illinois State Implementation Plan, as well as all other applicable Federal, State, and Local requirements.

Please note that additional rules addressing NO_x emissions from these CTs may be adopted in the near future in response to USEPA's so called "NO_x SIP call" and the development of Illinois's plans for attainment of the ozone air quality standard in the Chicago and Metro-East ozone nonattainment areas.

If you have any questions concerning this, please contact Troy Poorman at 217/782-2113.

Donald E. Sutton, P.E.
Manager, Permit Section
Division of Air Pollution Control

DES:TDP

CC: Region 1
FOIA

Attachment A

Emission Units

<u>Unit ID</u>	<u>Description</u>	<u>Number</u>	<u>Heat Input¹ (mmBtu/hr)</u>	<u>Electrical Output¹ (MWe)</u>	<u>Control</u>
1 - 3	Combustion turbines	3	1,763	172	Dry low NO _x combustors
1 - 3	Fuel gas heaters	3	3	--	Low NO _x burners

1. Nominal rating per unit.

Attachment B

Project Emissions (ton/yr)

<u>Unit</u>	<u>NO_x</u>	<u>CO</u>	<u>PM</u>	<u>VOM</u>	<u>SO₂</u>
Combustion turbines	326.4	89.1	86.5	11.25	5.4
Fuel heaters	<u>0.5</u>	<u>1.1</u>	<u>0.1</u>	<u>0.1</u>	--
Totals:	326.9	90.2	86.6	11.35	5.4

Table 1A

Hourly Emission Limits for
Individual Combustion Turbines
(pound/hour)

<u>Pollutant</u>	<u>Limit¹</u>
NO _x	64.8
CO ²	15.65
PM/PM ₁₀	18.0
VOM ²	1.2
SO ₂	1.1

1. Limits based on maximum emission rates provided by the manufacturer (based on operation at -20 °F ambient temperature) and other information provided in the permit application, as also used in the air quality modeling performed pursuant to the PSD rules. If the applicable limits for PM/PM₁₀ are not met by a CT, it shall also be presumed to constitute failure to use good combustion practice as required by Condition 2(b)(ii), as well as an exceedance of Condition 6.
2. Limits on NO_x, CO and VOM do not apply during initial shakedown of the CTs as addressed by Condition 9(a).

Table 1B

Combustion Turbine Annual Emission Limits (ton/yr)

<u>Pollutant</u>	<u>Contribution (Each)</u>	<u>Limit (Total)</u>
NO _x	108.8	326.4
CO	29.7	89.1
PM/PM ₁₀	28.8	86.5
VOM	3.75	11.25
SO ₂	1.79	5.40

The annual limits are based on maximum operation of three CTs for 3,200 hours per year each, average annual temperature, including emissions during startup and shutdown of CTs.